

IN THE CLAIMS:

1. (Previously Presented) An information disk recording/reproducing device, in which recording or reproduction can be performed on an information disk having an information recording track formed like a spiral or a concentric circle, comprising:
 - a disk rotating unit for rotating an information disk;
 - a rotational position information output unit for outputting rotational position information based on information indicating a rotation angle of the disk rotating unit by dividing one rotation into m angular divisions;
 - a reading unit for reading an information signal from an information disk;
 - a radius direction driving unit for driving the reading unit in a radius direction of an information disk;
 - a track cross detecting unit for detecting crossing of and generating a track cross signal based on a reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;
 - a track cross direction detecting unit for detecting a direction of a track crossing caused by a crossing based on the reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;
 - a counting unit for counting pulses of a track cross signal from the track cross detecting unit, with a code indicating a track cross direction from the track cross direction detecting unit, based on an output from the rotational position information output; and

a control unit which rotates the disk rotating unit at a first speed, obtains a first counted value of the counting unit while not operating the radius direction driving unit, rotates the disk rotating unit at one or more rotational speeds higher than a first rotational speed, obtains a second counted value from the counting unit while not operating the radius direction driving unit, and compares a predetermined threshold value to a vibration detection value as a function of a sum of absolute values of a difference between the first counted value and the second counted value.

2. (Previously Presented) An information disk recording/reproducing device, in which recording or reproduction can be performed on an information disk having an information recording track formed like a spiral or a concentric circle, comprising:

a disk rotating unit for rotating an information disk;

a rotational position information output unit for outputting rotational position information based on information indicating a rotation angle of the disk rotating unit by dividing one rotation into n angular divisions;

a rotational position information dividing unit which further divides each of the n angular divisions into k subdivisions and outputs the rotational position information;

a reading unit for reading an information signal from an information disk;

a radius direction driving unit for driving the reading unit in the radius direction of an information disk;

a track cross detecting unit for detecting crossing of a track and generating a track cross signal based on a reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;

a track cross direction detecting unit for detecting a direction of a track cross caused by a crossing based on the reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;

a counting unit for counting pulses of a track cross signal from the track cross detecting unit, with a code indicating a track cross direction from the track cross direction detecting unit, based on an output from the rotational position information dividing unit; and

a control unit which rotates the disk rotating unit at a first speed, obtains a first counted value of the counting unit while not operating the radius direction driving unit, rotates the disk rotating unit at one or more rotational speeds higher than a first rotational speed, obtains a second counted value from the counting unit while not operating the radius direction driving unit, and compares a predetermined threshold value to a vibration detection value as a function of a sum of absolute values of a difference between the first counted value and the second counted value.

3. (Currently Amended) The information disk recording/reproducing device according to claim 1, wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted value and the second counted value in a particular

Serial No. 10/505,479
Docket No. 28951.5338

angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

$$\overline{DAT[1] \sim DAT[m]} \quad (\text{Equation 1})$$

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 2})$$

and a value proportionate to the vibration quantity is used as a vibration detection value.

4. (Currently Amended) The information disk recording/reproducing device according to claim 1, wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted value and the second counted value in a particular angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

$$\overline{DAT[1] \sim DAT[m]} \quad (\text{Equation 3})$$

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 4})$$

a value proportionate to the vibration quantity is used as a vibration detection value, and the m angular divisions for one rotation, is determined within a permissible error range based on a maximum value of an error relative to an actual vibration quantity at this point, the maximum

value being expressed by the equation below:

$$\text{ERROR} \leq 1 - \cos \frac{\pi}{m} \quad (\text{Equation 5})$$

5. (Currently Amended) The information disk recording/reproducing device according to claim 1, wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted value and the second counted value in a particular angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

$$DAT[1] \sim DAT[m] \quad (\text{Equation 6})$$

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 7})$$

a value proportionate to the vibration quantity is used as a vibration detection value, and the m angular divisions for one rotation is set at 24 so that an error relative to an actual vibration quantity at this point has a maximum value of 1% or less.

6. (Previously Presented) A method for controlling a recording/reproducing speed of an information disk recording/reproducing device, in which recording or reproduction can be performed on an information disk having an information recording track formed like a spiral or a concentric circle, the device comprising a disk rotating unit for rotating the information disk, a

reading unit for reading an information signal from the information disk, and a radius direction driving unit for driving the reading unit in a radius direction of the information disk, the method comprising the steps of:

rotating an information disk;

outputting rotational position information by dividing one rotation into m angular divisions;

reading an information signal from an information disk;

driving the reading unit in the radius direction of an information disk;

detecting a crossing of a track and generating a track cross signal based on a reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;

detecting a direction of a track cross caused by a crossing based on the reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;

counting pulses of a track cross signal, with a code indicating the track cross direction, to obtain a first counted value by dividing one rotation of the rotational position information into m angular divisions while rotating the disk rotating unit at a first speed and not operating the radius direction driving unit;

counting pulses of the track cross signal, with the code indicating the track cross direction, to obtain a second counted value by dividing one rotation of the rotational position

information into m angular divisions while rotating the disk rotating unit at one or more speeds higher than a first speed and not operating the radius direction driving unit; and

comparing a predetermined threshold value to a vibration detection value as a function of a sum of absolute values of a difference between the first counted value and the second counted value.

7. (Previously Presented) A method for controlling a recording/reproducing speed of an information disk recording/reproducing device, in which recording or reproduction can be performed on an information disk having an information recording track formed like a spiral or a concentric circle, the device comprising a disk rotating unit for rotating the information disk, a reading unit for reading an information signal from the information disk, and a radius direction driving unit for driving the reading unit in a radius direction of the information disk, the method comprising the steps of:

rotating an information disk;

outputting rotational position information by dividing one rotation into m angular divisions and subdividing each m angular division into k subdivisions;

reading an information signal from an information disk;

driving the reading unit in the radius direction of an information disk;

detecting a crossing of a track and generating a track cross signal based on a reproduction signal when the reading unit traverses an information recording track by the driving of the radius

direction driving unit;

detecting a direction of the track cross caused by the crossing based on the reproduction signal when the reading unit traverses an information recording track by the driving of the radius direction driving unit;

counting pulses of the track cross signal, with a code indicating a track cross direction, to obtain a first counted value by dividing one rotation of the rotational position information into m angular divisions while rotating the disk rotating unit at a first speed and not operating the radius direction driving unit;

counting pulses of the track cross signal, with the code indicating a ~~the~~ track cross direction, to obtain a second counted value in each of the areas provided by dividing one rotation of the rotational position information into m angular divisions while rotating the disk rotating unit at one or more rotational speeds higher than a first rotational speed and not operating the radius direction driving unit; and

comparing a predetermined threshold value to a vibration detection value as a function of a sum of absolute values of a difference between the first counted value and the second counted value.

8. (Currently Amended) The method for controlling a recording/reproducing speed of an information disk recording/reproducing device according claim 6 , wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted

value and the second counted value in a particular angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

~~DAT[1] ~ DAT[m]~~ (Equation 8)

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 9})$$

and a value proportionate to the vibration quantity is used as a vibration detection value.

9.(Currently Amended) The method for controlling a recording/reproducing speed of the information disk recording/reproducing device according claim 6 , wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted value and the second counted value in a particular angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

~~DAT[1] ~ DAT[m]~~ (Equation 10)

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 11})$$

a value proportionate to the vibration quantity is used as a vibration detection value, and the m angular divisions for one rotation is determined within a permissible error range based on a maximum value of an error relative to an actual vibration quantity at this point, the maximum

Serial No. 10/505,479
Docket No. 28951.5338

value being expressed by the equation below:

$$\text{ERROR} \leq 1 - \cos \frac{\pi}{m} \quad (\text{Equation 12})$$

10. (Currently Amended) The method for controlling a recording/reproducing speed of the information disk recording/reproducing device according to claim 6, wherein in each of the m angular divisions, a vibration component is given by a difference between the first counted value and the second counted value in a particular angular division, the vibration component for each angular division is expressed by the terms DAT[1] through DAT[m], equation below:

~~DAT[1] ~ DAT[m]~~
$$(\text{Equation 13})$$

wherein a vibration quantity is given by at this point is approximated by the equation below:

$$\text{VIBRATION QUANTITY} = \frac{1}{4} \sum_{x=1}^m |DAT[x]| \quad (\text{Equation 14})$$

a value proportionate to the vibration quantity is used as a vibration detection value, and the m angular divisions for one rotation is set at 24 so that an error relative to an actual vibration quantity at this point has a maximum value of 1% or less.